

Consultative hematology: Hospital- based and selected outpatient topics

I. Consultation for surgery and invasive procedures

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The role of the hematology consultant

AGENDA:

Consultation for surgery and invasive procedures:

A. Perioperative venous thromboembolism (VTE):

- Prevention and treatment of postoperative VTE
- Perioperative management of antithrombotic therapy

B. Perioperative hemorrhage:

- Preoperative assessment of bleeding risk
- Management of perioperative hemorrhage
- Perioperative red blood cell transfusion.

Preoperative assessment of bleeding risk

Preoperative assessment of bleeding risk

Bleeding risk is related:

1. Surgical factors:

- Nature and extent of the intervention
- Vascularity and fibrinolytic activity of the surgical bed,
- Compressibility of the site
- Ability to achieve surgical hemostasis
- The procedure may induce a hemostatic defect (e.g. platelet dysfunction due to cardiopulmonary bypass).

2. Host factors:

- Congenital or acquired hemostatic defect
- Use of drugs that affect hemostasis.

Preoperative assessment of bleeding risk

Focused medical history and Ex (the most important):

- Abnormal bleeding;
- Response to prior hemostatic challenges, such as surgeries, trauma, and childbirth;
- Previous common procedures, such as tooth extraction and tonsillectomy.
- Comorbidities: liver, CT or vascular disorders
- Use of medications that could affect hemostasis.
- Family history of bleeding

Preoperative assessment of bleeding risk

Hemostatic laboratory evaluation:

- Should be performed before the patient is cleared for surgery: if the history or physical examination is suggestive of a bleeding diathesis.
- Neither cost effective nor informative in patients without a history suggestive of a bleeding disorder.
- Initial testing should include a PLT count, PT, and aPTT.
- Further testing should be guided by the clinical history and the results of the initial laboratory evaluation.

Management of perioperative hemorrhage

Management of perioperative hemorrhage

Plan for perioperative hemostatic management:

Based on:

- Nature and severity of the defect
- Bleeding risk of the anticipated procedure

Procedure	Moderate- to high-risk	Neurosurgery and ophthalmologic
Desired PLT count	$\geq 50 \times 10^9/L$	$\geq 100 \times 10^9/L$
Desired fibrinogen level	$\geq 100 \text{ mg/dL}$	

Management of perioperative hemorrhage

If basic hemostatic laboratory parameters are normal or bleeding persists after correction of these parameters:

- **Inadequate local hemostasis** due to vessel injury is suggested and surgical re-exploration should be considered.
- **Some systemic bleeding diatheses** may not be identified by basic laboratory testing:
 - Mild deficiency of factors VIII, IX, or XI;
 - von Willebrand disease;
 - qualitative platelet defects;
 - A disorder of fibrinolysis

Hemostatic Agents

1. Antifibrinolytic therapy:

Generic	Trade	Indications	Dose
Tranexamic acid	Cyklocapron (Pfizer) •Vial: 500 mg •Tab: 500 mg	<ul style="list-style-type: none"> • Mucocutaneous bleeding • Reduce blood loss and blood transfusion after cardiac surgery, liver transplantation, and prostatectomy. • No increased risk of thromboembolism • The two drugs are comparable in reducing postoperative blood loss. 	<ul style="list-style-type: none"> • IV: 15 mg/kg preop. → 15 mg/kg/8 hrs. • PO: 1-1.5g/ 8-12 hrs for 12 days post-op.
Aminocaproic acid	Aminocaproic a (Hospira) Amicar (Clover) •Vial: 5 gm/20ml •Tab: 500, 1000 mg		<ul style="list-style-type: none"> • IV: 4 -5 g IVI during first hr → IVI of 1 g /hr for 8 hrs or until the bleeding stops. • PO: 5000 mg during first hr → 1000 mg/hr for 8 hrs or until the bleeding stops.

Hemostatic Agents

2. Prothrombin complex concentrates:

Trade	Indications	Dosage
Beriplex 500 IU in 20 ml	<ul style="list-style-type: none">• Hemophilia B• Warfarin-induced coagulopathy• Use for management of perioperative hge is not prospectively investigated	1 ml/kg (adjust according to INR) IV (8 ml/min)

Hemostatic Agents

3. Recombinant factor VIIa (rFVIIa):

Trade	Indications	Dosage
NovoSeven (Nordisk)	<ul style="list-style-type: none"> • Approved for congenital and acquired hemophilia, cong. factor VII deficiency. • Off-label: perioperative bleeding (prostatectomy, cardiac). • No benefit in cirrhotic patients undergoing partial hepatectomy or liver transplant. • May be useful for selected patients with life-threatening bleeding despite conventional measures and appropriate transfusion therapy. • Indiscriminant use for management of perioperative hge should be discouraged • Potential arterial (not venous) thrombotic risk particularly >65 years or with preexisting CV risk factors 	<p>Bleeding: 90 Ugm /kg IV /2 hrs until hemostasis is achieved</p> <p>Surgery: 90 Ugm/kg IV:</p> <ul style="list-style-type: none"> • Before surgery. • During surgery: every 2hrs • Post-surgical dosing: <ul style="list-style-type: none"> - Minor surgery: every 2 hrs for 48 hrs → every 2-6 hrs, until healing has occurred - Major surgery: every 2 hrs for 5 days → every 4 hrs, until healing has occurred

Hemostatic Agents

4. Desmopressin acetate :

Trade	Indications	Dose
DDAVP (Sanofi) Minirin (Ferring) <ul style="list-style-type: none">• Vial: 0.004 mg/ml• Spray: 0.1 mg/ml	Mild bleeding in: <ul style="list-style-type: none">• Mild hemophilia A,• Mild vWD• Qualitative platelet defect.• Response to drug should be documented before its use in the acute setting.	<ul style="list-style-type: none">• IV: 0.3 mcg/kg once over 15-30 min. (Preop. doses given 30 min. before surgery).• Intranasal: 1 spray in each nostril

Hemostatic Agents

5. Promoters of Capillary endothelial resistance & PLT adhesion:

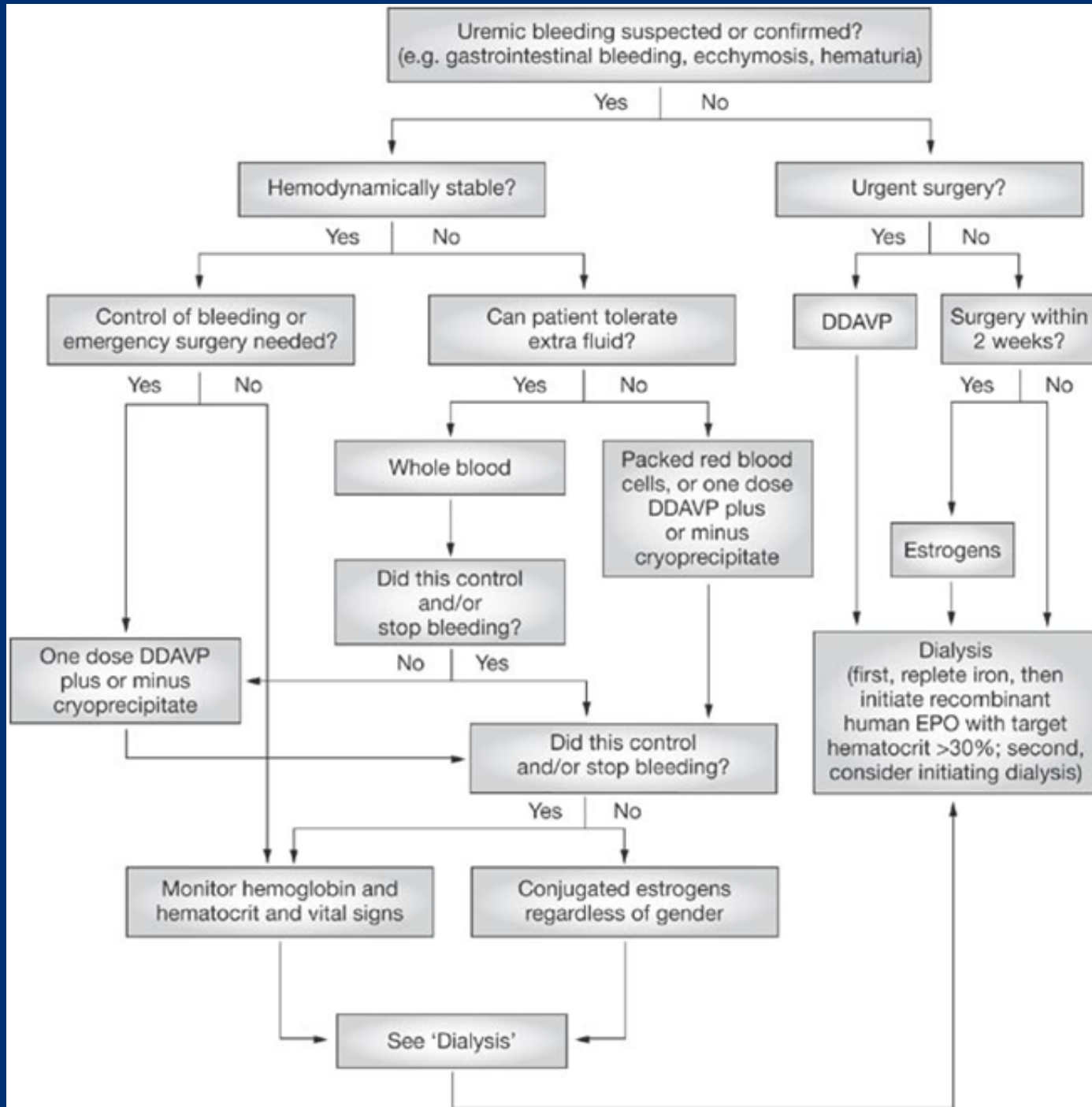
Generic	Trade	Indications	Dose
Ethamsylate	Dicynone: <ul style="list-style-type: none">• Tab 250, 500 mg• Ampule 500 mg	<ul style="list-style-type: none">• Prophylaxis & control of hge from small BV & capillaries: menorrhagia, after trans-urethral resection of the prostate, hematemesis, melena, hematuria, epistaxis;• Secondary bleeding due to: thrombocytopenia, thromboasthenia, hypocoagulation• Less effective than other treatments• Its use is no longer recommended.	500 mg four times daily

Hemostatic Agents

6. Conjugated estrogens:

Trade	Indications	Dose
Premarin (Pfizer) <ul style="list-style-type: none">•Tab: 0.6, 1.25 mg•Vial: 25 mg	Platelet-related perioperative bleeding in patients with chronic kidney disease	<ul style="list-style-type: none">• IV: 0.6 mg/kg over 30–40 min/D for 5 days• PO: 50 mg daily until bleeding time normalized or for 9 days

Management of Uremic Bleeding



Hedges SJ et al. *Nat Clin Pract Nephrol* (2007)

Perioperative red blood cell transfusion



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Perioperative red blood cell transfusion

- RBC transfusion is common in the perioperative setting (e.g. 40-90% after CABG and total hip arthroplasty).
- **The threshold for RBC transfusion** in surgical patients has changed over time:
 - For many years, patients generally were transfused to maintain a Hb ≥ 10 g/dL.
 - Recently: reexamination of transfusion practices (adverse effects, costs).

Perioperative red blood cell transfusion

Hazards of Intraoperative blood transfusion:

- **Adverse events:**
 - Transmission of blood-borne pathogens
 - Transfusion reactions
 - Circulatory overload.
 - Higher rate of mortality and postoperative wound, renal, infectious, and pulmonary complications.
- **Liberal RBC transfusion** strategy does not improve clinical outcomes
- **Restrictive transfusion** strategy is as safe, if not safer.

Perioperative red blood cell transfusion

Recent transfusion guidelines:

- **For adult and pediatric ICU patients:** transfusion should be considered at Hb levels of ≤ 7 g/dL.
- **In postoperative surgical patients:** transfusion should be considered at:
 - Hb levels of ≤ 8 g/dL, or
 - Symptoms: chest pain, orthostatic hypotension or tachycardia unresponsive to fluid resuscitation, or CHF.

Perioperative red blood cell transfusion

Types of transfusion:

- Most RBC transfusions administered in the perioperative setting are **allogeneic**.
- **Autologous RBCs**, collected through preoperative autologous donation (**PAD**) is restricted to:
 - Healthy individuals
 - Requiring blood-intensive surgeries
 - In which the likelihood of blood loss in excess of 500-1,000 ml is at least 5%-10%.

Perioperative red blood cell transfusion

Drawbacks of PAD:

1. More **expensive** than allogeneic blood
2. As with any blood product, is subject to **bacterial growth** during liquid storage, volume overload, hemolysis from improper handling of stored units, and clerical error → inadvertent administration of an allogeneic product.
3. Patients who underwent PAD are **more likely to receive a blood transfusion** than those who did not.
4. **The donation process itself carries a small risk of AEs**, including hypotension, orthostasis, arrhythmias, and ST-T wave changes (contraindicated in patients with recent MI or CVS, HF, or AS).

Thank you